



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest and Alaska Fisheries Center
Resource Assessment and Conservation
Engineering Division
7600 Sand Point Way Northeast
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Seattle, Washington 98115-0070

June 23, 1988

CRUISE RESULTS

NOAA Vessel John N. Cobb
Cruise No. JC-88-02
Midwater Trawl Testing/Bottom Trawl Dynamics Study

CRUISE PERIOD AND AREA

Between April 12 and 22, 1988, a series of trawl dynamics experiments were performed aboard the NOAA R/V John N. Cobb by personnel of the National Marine Fisheries Service, Northwest and Alaska Fisheries Center (NWAFC), Resource Assessment and Conservation Engineering (RACE) Division and Auke Bay Laboratory (ABL). These studies were performed in Saratoga Passage, Admiralty Inlet, and central Puget Sound.

OBJECTIVES

The primary objectives of the cruise were:

1. Test net monitors and determine the best methods for fishing a 264-Midwater Rope Trawl on the John N. Cobb.
2. Observe changes in dimensions of the 83/112 bottom trawl when fished at different depths and scope ratios.
3. Train RACE Division personnel in the shipboard operation of the SCANMAR net mensuration system.

Secondary objectives of the cruise included:

1. Test alternative methods of deploying SCANMAR trawl sensing systems.



2. Collect material for a net mensuration training video.
3. Conduct shipboard tests of an electronic fish measuring board.
4. Conduct tests of a microcomputer based bathythermograph.

GEAR, METHODS, AND RESULTS

Midwater Trawl Testing

From April 12 to 15, the 264-Midwater Rope Trawl and net sensor were tested in central Puget Sound. An initial problem with orientation of the net monitor was corrected by attaching a row of 8-inch floats to the headrope ahead of the transducer. The trawl functioned quite well, responding quickly to adjustments by the vessel. The 3-meter alloy doors fished better with an additional 150 lbs of weight on the shoes. Various sizes of weights were attached to the lower wings to find the one giving the best vertical opening.

Bottom Trawl Dynamics

From April 15 to 20 and on the 22nd, an experiment was conducted to examine the effect of using different scope lengths at various depths on trawl mouth dimensions. The 83/112 bottom trawl with 6-ft by 9-ft trawl doors was the gear used. Trawl headrope height and wing spread and water depth were measured with a SCANMAR net mensuration system. Vessel speed was measured using radar fixes of the start and end of each trawl tow, cross checked with speed estimates from an electronic LORAN navigator.

The trawl was fished 12 times at each of seven sites (Figure 1). Four different warp lengths were each used three times at each site. The order in which these 12 tows were done was randomly selected. A change in operating procedures from the last study (JC-87-05) greatly increased the number of observations taken. Instead of lifting the trawl off of the bottom before changing warp lengths, the trawl was left on the bottom during changes.

Early in the experiment, the trawl became "muddled down" in soft bottom substrate. Since this type of bottom occurred at all of the study sites, the original steel trawl doors, weighing 1,150 lbs were exchanged for lighter aluminum doors, weighing only 700 lbs.

Measurements of trawl dimensions were made on 93 tows covering depths from 115 m to 180 m (8-98 fathoms). An initial review of the data indicates that the factors affecting trawl height and spread most were the total amount of warp used and the amount by

which the scope exceeded that necessary to reach the bottom. In both cases, tows using more warp tended to have wider spreads and shorter vertical openings.

The trawl used in this experiment is the standard sampling net for RACE Division crab/groundfish surveys in the eastern Bering Sea. Measurements derived from this scope-depth experiment are likely not directly comparable to net openings that occur during these surveys for several reasons including: lighter doors were used, the substrate was softer than that usually encountered in the eastern Bering Sea, and the Cobb could not tow the net at speeds comparable to the surveys. Despite this, these results provide valuable insight into the relationship between trawl dimensions and depth and warp length. Measurements from this experiment will be used to develop a formula describing the relationship of the various parameters. Net mensuration data from the Bering Sea surveys will then be fit to this formula by regression to model trawl behavior during the surveys.

Net Mensuration Training

On April 21, 15 Race Division personnel were trained in the installation and operation of the SCANMAR net mensuration system. Primary subjects covered included the attachment and deployment of the sensors and hydrophone, wiring hookups, and operation of the data collection program.

Secondary Projects

Several ancillary projects were completed during the cruise:

- 1) A new harness system for attaching SCANMAR headrope units to the trawl was tested and determined to be an improvement over previous methods.
- 2) The effects of different deployments of the SCANMAR hydrophone on reception were observed. Deployment from an outrigger provided easier handling and more consistent reception than launching over the stern or down the warps.
- 3) Video footage was collected for use in a net mensuration training video.
- 4) A microcomputer based bathythermograph was tested, comparing readings with the Cobb's XBT system. While temperature measurements were similar, deployment and data output problems still need to be solved.
- 5) Brief shipboard tests of an electronic fish measuring board were conducted in which some data recording problems were detected.

SCIENTIFIC PERSONNEL

	<u>Name</u>	<u>Dates</u>	<u>Sex/ Nationality</u>	<u>Title</u>
1.	Ken Krieger	4/12-15	M/USA	Chief Scientist
2.	Dave King	4/12-15	M/USA	Gear Specialist
3.	Craig Rose	4/15-21	M/USA	Chief Scientist
4.	Phil Wyman	4/15-22	M/USA	Biologist
5.	Rob Wolotira	4/22	M/USA	Biologist
6.	Ron Payne	4/20-21	M/USA	Biologist
7.	RACE Trainees*	4/21	M&F/USA	Biologists

* Herb Shippen	Jennifer Sassano	Jim Smart
Therese Armetta	Don Fisk	Mike Bohle
Frank Shaw	Terry Sample	Dave King
Doug Smith	Ed Nunnallee	Gary Walters
Norm Parks	Rick Henry	Paul Raymore

For further information contact either

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